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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,754	01/17/2006	Takayuki Takeuchi	061352-0120	1758

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MCDERMOTT WILL & EMERY LLP
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WASHINGTON, DC 20005-3096

EXAMINER

DICKEY, THOMAS L

ART UNIT	PAPER NUMBER
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2826

MAIL DATE	DELIVERY MODE
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10/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/564,754	Applicant(s) TAKEUCHI ET AL.	
	Examiner Thomas L. Dickey	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 17 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/17/2006; 06/25/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. The preliminary amendment filed on 01/17/2006 has been entered.

Oath/Declaration

2. The oath/declaration filed on 01/17/2006 is acceptable.

Drawings

3. The formal drawings filed on 01/17/2006 are acceptable.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

5. The Information Disclosure Statements filed on 01/17/2006 and 06/25/2008 have been considered.

Specification

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

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Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

A. Claims 11-15 are rejected under 35 U.S.C. 102(b) as being anticipated by YU-DASAKA ET AL. (5,989,945).

Yudasaka et al. discloses a method of manufacturing a thin-film transistor comprising a semiconductor layer 404; a source region 431, a drain region 441, and a gate region 415 formed on the semiconductor layer 404 to be separated from each other (as seen in figure 19), comprising the steps (figures 4 and 5) of selecting inorganic material particles so as to form a predetermined particle size distribution; forming composite material by dispersing the particles dissolved in a predetermined solution in an organic material so as to form a predetermined particle dispersion condition of a semiconductor layer forming material, coating said semiconductor layer forming material on a predetermined location, and drying the material to form said semiconductor layer 404. Note figures 5, 6, 19, column 13 lines 56-67, and column 14 lines 1-53 of Yudasaka et al.

The applicant's claim 12 does not distinguish over the Yudasaka et al. reference regardless of the functions allegedly performed by the claimed inorganic material, be-

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cause only the device per se is relevant, not the recited function of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material.

Note that functional language in a device claim is directed to the device per se, no matter which of the device's functions is referred to in the claim. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) ("[A]pparatus claims cover what a device *is*, not what a device *does*" [emphasis in original]); *In re King*, 231 USPQ 136 (Fed. Cir. 1986) ("It did not suffice merely to assert that [the cited prior art] does not inherently achieve [the claimed function], challenging the PTO to prove the contrary by experiment or otherwise. The PTO is not equipped to perform such tasks"); *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (claiming a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable); *Ex parte Smith*, 83 USPQ2d 1509, 1514 (Bd. Pat. App. & Int. 2007) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product"); and *Leggett & Platt Inc. v. VUTEk Inc.*, 537 F.3d 1349, 1352, 87 USPQ2d 1947, 1951 (Fed. Cir. 2008) ("Moreover, because the claim is written with functional rather than structural language—it requires the cold UV assembly to be 'effective to'

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substantially cure rather than requiring ink to be substantially cured—the claim limitation will be anticipated so long as the LEDs disclosed in the '823 patent are able to cure the ink to a great extent"). See MPEP § 2114.

In this case, it is reasonable to assume that Yudasaka et al.'s inorganic material is capable of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic material, because a comparison of Applicant's specification to Yudasaka et al.'s disclosure reveals that Yudasaka et al. discloses inorganic material that is identical to the inorganic material Applicant describes as being capable of performing the function of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material.

Because it is reasonable to assume that Yudasaka et al.'s inorganic material is capable of performing the claimed function, a prima facie case is established, shifting the burden to Applicants to provide evidence showing, to the contrary, that Yudasaka et al.'s inorganic material is not so capable. See MPEP § 2114.

B. Claims 1-15 are rejected under 35 U.S.C. 102(b) as being anticipated by KLAUK ET AL. (2003/0080426).

With regard to claims 1-10 Klauk et al. discloses a thin-film transistor comprising a semiconductor layer 2, and a source region 11, a drain region 12, and a gate region 6 which are formed on the semiconductor layer 2 to be separated from each other;

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wherein said semiconductor layer 2 is made of composite material comprising organic semiconductive material 5a-5b and a group of particles 4 comprising at least first particle group and second particle group containing inorganic conductive/semiconductive materials, having different average particle diameters, wherein a maximum particle diameter of said particles 4 is smaller than a distance between said source region 11 and said drain region 12, a content rate of said particles 4 in said semiconductor layer 2 is more than 0 volume % and less than 60 volume %, and the average particle diameter of said first particle group is more than 0% and less than 15% of the average particle diameter of said second particle group. Note figure 3E and paragraphs 0066-0068 of Klauk et al.

With regard to Claims 11-15 Klauk et al. discloses a method of manufacturing a thin-film transistor comprising a semiconductor layer 2; a source region 11, a drain region 12, and a gate region 6 formed on the semiconductor layer 2 to be separated from each other (as seen in figure 19), comprising the steps of selecting inorganic material particles so as to form a predetermined particle size distribution; forming composite material by dispersing the particles dissolved in a predetermined solution in an organic material so as to form a predetermined particle dispersion condition of a semiconductor layer forming material, coating said semiconductor layer forming material on a predetermined location, and drying the material to form said semiconductor layer 2. Note figure 3E and paragraphs 0066-0068 of Klauk et al.

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The applicant's claims 2, 4 and 12 do not distinguish over the Klauk et al. reference regardless of the functions allegedly performed by the claimed particles and inorganic material, because only the device per se is relevant, not the recited functions of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region and inhibiting electrical connection by a network of said particles between said source region and said drain region.

Note that functional language in a device claim is directed to the device per se, no matter which of the device's functions is referred to in the claim. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) ("[A]pparatus claims cover what a device *is*, not what a device *does*" [emphasis in original]); *In re King*, 231 USPQ 136 (Fed. Cir, 1986) ("It did not suffice merely to assert that [the cited prior art] does not inherently achieve [the claimed function], challenging the PTO to prove the contrary by experiment or otherwise. The PTO is not equipped to perform such tasks"); *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (claiming a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable); *Ex parte Smith*, 83 USPQ2d 1509, 1514 (Bd. Pat. App. & Int. 2007) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or sub-

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stantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product"); and *Leggett & Platt Inc. v. VUTEk Inc.*, 537 F3d 1349, 1352, 87 USPQ2d 1947, 1951 (Fed. Cir. 2008) ("Moreover, because the claim is written with functional rather than structural language—it requires the cold UV assembly to be 'effective to' substantially cure rather than requiring ink to be substantially cured—the claim limitation will be anticipated so long as the LEDs disclosed in the '823 patent are able to cure the ink to a great extent"). See MPEP § 2114.

In this case, it is reasonable to assume that Klauk et al.'s inorganic material is capable of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region, because a comparison of Applicant's specification to Klauk et al.'s disclosure reveals that Klauk et al. discloses inorganic material that is identical to the inorganic material Applicant describes as being capable of performing the function of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region.

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Because it is reasonable to assume that assume that Klauk et al.'s inorganic material is capable of performing the claimed function, a prima facie case is established, shifting the burden to Applicants to provide evidence showing, to the contrary, that Klauk et al.'s inorganic material is not so capable. See MPEP § 2114.

C. Claims 1-15 are rejected under 35 U.S.C. 102(b) as being anticipated by NARAYAN (2002/0084504).

With regard to claims 1-10 Narayan discloses a thin-film transistor comprising a semiconductor layer 12, and a source region 16, a drain region 18, and a gate region 14 which are formed on the semiconductor layer 12 to be separated from each other; wherein said semiconductor layer 12 is made of composite material comprising organic semiconductive material (a polymer matrix including regioregular polyakyl thiophene polymers P3ATs with regiospecific configurations optimal for semiconducting polymers, as disclosed at paragraph 0026) and a group of particles (C_{60} buckyballs, TiO_2 nanoparticles, and/or dye-coated TiO_2 nanoparticles, as disclosed at paragraph 0026) comprising at least first particle group and second particle group containing inorganic conductive/semiconductive materials, having different average particle diameters, wherein a maximum particle diameter of said particles is smaller than a distance between said source region 16 and said drain region 18, a content rate of said particles in said semiconductor layer 12 is more than 0 volume % and less than 60 volume %, and the average particle diameter of said first particle group is more than 0% and less than 15% of

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the average particle diameter of said second particle group. Note figure 1B and paragraphs 0023-0032 of Narayan.

With regard to Claims 11-15 Narayan discloses a method of manufacturing a thin-film transistor comprising a semiconductor layer 12; a source region 16, a drain region 18, and a gate region 14 formed on the semiconductor layer 12 to be separated from each other (as seen in figure 19), comprising the steps of selecting inorganic material particles so as to form a predetermined particle size distribution; forming composite material by dispersing the particles dissolved in a predetermined solution in an organic material so as to form a predetermined particle dispersion condition of a semiconductor layer forming material, coating said semiconductor layer forming material on a predetermined location, and drying the material to form said semiconductor layer 12. Note figure 1B and paragraphs 0023-0032 of Narayan.

The applicant's claims 2, 4 and 12 do not distinguish over the Narayan reference regardless of the functions allegedly performed by the claimed particles and inorganic material, because only the device per se is relevant, not the recited functions of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region and inhibiting electrical connection by a network of said particles between said source region and said drain region.

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Note that functional language in a device claim is directed to the device per se, no matter which of the device's functions is referred to in the claim. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) ("[A]pparatus claims cover what a device *is*, not what a device *does*" [emphasis in original]); *In re King*, 231 USPQ 136 (Fed. Cir. 1986) ("It did not suffice merely to assert that [the cited prior art] does not inherently achieve [the claimed function], challenging the PTO to prove the contrary by experiment or otherwise. The PTO is not equipped to perform such tasks"); *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (claiming a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable); *Ex parte Smith*, 83 USPQ2d 1509, 1514 (Bd. Pat. App. & Int. 2007) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product"); and *Leggett & Platt Inc. v. VUTEk Inc.*, 537 F.3d 1349, 1352, 87 USPQ2d 1947, 1951 (Fed. Cir. 2008) ("Moreover, because the claim is written with functional rather than structural language—it requires the cold UV assembly to be 'effective to' substantially cure rather than requiring ink to be substantially cured—the claim limitation will be anticipated so long as the LEDs disclosed in the '823 patent are able to cure the ink to a great extent"). See MPEP § 2114.

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In this case, it is reasonable to assume that Narayan's inorganic material is capable of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region, because a comparison of Applicant's specification to Narayan's disclosure reveals that Narayan discloses inorganic material that is identical to the inorganic material Applicant describes as being capable of performing the function of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region.

Because it is reasonable to assume that assume that Narayan's inorganic material is capable of performing the claimed function, a prima facie case is established, shifting the burden to Applicants to provide evidence showing, to the contrary, that Narayan's inorganic material is not so capable. See MPEP § 2114.

D. Claims 1-15 are rejected under 35 U.S.C. 102(b) as being anticipated by DUTHALER ET AL. (2002/0119584).

With regard to claims 1-10 Duthaler et al. discloses a thin-film transistor comprising a semiconductor layer 70, and a source region 10, a drain region 20, and a gate region 30 which are formed on the semiconductor layer 70 to be separated from each other;

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wherein said semiconductor layer 70 is made of composite material comprising organic semiconductive material (such as, note paragraph 0095, poly(3-alkyl)thiophene, hexathiophene and other oligothiophenes) and a group of particles (such as, again note paragraph 0095, silicon, cadmium selenide, gallium arsenide, and other semiconductors) comprising at least first particle group and second particle group containing inorganic conductive/semiconductive materials, having different average particle diameters, wherein a maximum particle diameter of said particles is smaller than a distance between said source region 10 and said drain region 20, a content rate of said particles in said semiconductor layer 70 is more than 0 volume % and less than 60 volume %, and the average particle diameter of said first particle group is more than 0% and less than 15% of the average particle diameter of said second particle group. Note figures 1-4 and paragraphs 0050-0068 and 0092-0096 of Duthaler et al.

With regard to Claims 11-15 Duthaler et al. discloses a method of manufacturing a thin-film transistor comprising a semiconductor layer 70; a source region 10, a drain region 20, and a gate region 30 formed on the semiconductor layer 70 to be separated from each other (as seen in figure 19), comprising the steps of selecting inorganic material particles so as to form a predetermined particle size distribution; forming composite material by dispersing the particles dissolved in a predetermined solution in an organic material so as to form a predetermined particle dispersion condition of a semiconductor layer forming material, coating said semiconductor layer forming material on a prede-

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terminated location, and drying the material to form said semiconductor layer 70. Note figures 1-4 and paragraphs 0050-0068 and 0092-0096 of Duthaler et al.

The applicant's claims 2, 4 and 12 do not distinguish over the Duthaler et al. reference regardless of the functions allegedly performed by the claimed particles and inorganic material, because only the device per se is relevant, not the recited functions of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region and inhibiting electrical connection by a network of said particles between said source region and said drain region.

Note that functional language in a device claim is directed to the device per se, no matter which of the device's functions is referred to in the claim. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) ("[A]pparatus claims cover what a device *is*, not what a device *does*" [emphasis in original]); *In re King*, 231 USPQ 136 (Fed. Cir, 1986) ("It did not suffice merely to assert that [the cited prior art] does not inherently achieve [the claimed function], challenging the PTO to prove the contrary by experiment or otherwise. The PTO is not equipped to perform such tasks"); *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977) (claiming a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable); *Ex parte Smith*, 83

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USPQ2d 1509, 1514 (Bd. Pat. App. & Int. 2007) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product"); and *Leggett & Platt Inc. v. VUTEk Inc.*, 537 F3d 1349, 1352, 87 USPQ2d 1947, 1951 (Fed. Cir. 2008) ("Moreover, because the claim is written with functional rather than structural language—it requires the cold UV assembly to be 'effective to' substantially cure rather than requiring ink to be substantially cured—the claim limitation will be anticipated so long as the LEDs disclosed in the '823 patent are able to cure the ink to a great extent"). See MPEP § 2114.

In this case, it is reasonable to assume that Duthaler et al.'s inorganic material is capable of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive material, and inhibiting electrical connection by a network of said particles between said source region and said drain region, because a comparison of Applicant's specification to Duthaler et al.'s disclosure reveals that Duthaler et al. discloses inorganic material that is identical to the inorganic material Applicant describes as being capable of performing the function of achieving, during ON operation of the thin-film transistor, an electric resistance in the inorganic material that is lower than that of said organic semiconductive

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material, and inhibiting electrical connection by a network of said particles between said source region and said drain region.

Because it is reasonable to assume that assume that Duthaler et al.'s inorganic material is capable of performing the claimed function, a prima facie case is established, shifting the burden to Applicants to provide evidence showing, to the contrary, that Duthaler et al.'s inorganic material is not so capable. See MPEP § 2114.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over REDDY (2002/0094639) in view of DUTHALER ET AL. (2002/0119584). In the examiner's opinion, this/these claim(s) would have been obvious according to one of the rationales expressed in the *Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.*, as published at 72 Federal Register 57526 et seq.¹ (10/10/2007).

¹ Available at <http://www.uspto.gov/web/offices/com/sol/notices/72fr57526.pdf> See also MPEP, Eighth Ed. Rev. 6 (Sept. 2007) §§ 2141 et seq., available at

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The Guidelines explain that an invention that would have been obvious to a person of ordinary skill at the time of the invention is not patentable. The Guidelines point out that, as reiterated by the Supreme Court in KSR, the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.* Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

- (1) Determining the scope and content of the prior art;
- (2) Ascertaining the differences between the claimed invention and the prior art, and
- (3) Resolving the level of ordinary skill in the pertinent art.

Examining this last factor first, it is noted that any obviousness rejection should include, either explicitly or implicitly in view of the prior art applied, an indication of the level of ordinary skill. This is an essential finding because (as the Guidelines point out) a finding as to the level of ordinary skill may be used as a partial basis for a resolution of the issue of obviousness. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. Factors that may be considered in determining the level of ordinary skill in the art include:

- (1) "Type of problems encountered in the art;"
- (2) "prior art solutions to those problems;"
- (3) "rapidity with which innovations are made;"
- (4) "sophistication of the technology;" and
- (5) "educational level of active workers in the field."

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In a given case, every factor may not be present, and one or more factors may predominate.

In the present case, Applicant has presented claims to a device classified in Class 257 (Semiconductor Devices). The types of problems encountered in Class 257 typically are highly complex, involving questions of electrodynamics, thermodynamics, crystallography, and quantum mechanics. Prior art solutions to the problems presented in this field demonstrate thinking of the highest order. Many prior art solutions in this field have won Nobel prizes. Past Nobel prizewinners for Class 257 innovations include John Bardeen, William Shockley, Jack Kilby, Leo Esaki, Nick Basow, Zhores Alferov, Pierre-Gilles de Gennes, and probably a half dozen more this writer has forgotten. Note, for example, that the most recent Nobel Prize in physics went to Albert Fert and Peter Grünberg for an innovative solution to the problem of Giant Magnetic Resonance, a solution now incorporated into many semiconductor memory devices. Innovations in Class 257 are made with extremely high rapidity (see, e.g. "Moore's Law"). Technology used to make and practice inventions in this field are highly sophisticated. Some "fabs" (as those of skill in the art call the factories for making these devices) now cost in excess of one billion dollars each, and perform literally hundreds of billions of operations per hour. Finally, the educational level of active workers in this field is extremely high – Ph.D.s are common, and a bachelor's degree in engineering is the absolute minimum educational level of workers in this field.

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In short, the level of ordinary skill in this field is extremely high. In *KSR* (while considering an invention involving the substitution of one simple mechanical linkage for another), the Supreme Court cautioned, “A person of ordinary skill is also a person of ordinary creativity”. *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). Had the Court been looking at the variety of extraordinarily valuable (from lifestyle-changing, such as high-speed communications and computing, to handy devices such as iPods and cellphones) and difficult solutions to challenging problems that have been accomplished in the semiconductor art in recent years, the Court might easily have said that in the semiconductor art the person of ordinary skill is a person of extraordinary creativity.

Next, we consider the first and second factual findings required by *Graham*. The scope and content of the prior art includes, in the Reddy disclosure, a description of an active matrix display, radio ID tag, or portable device, wherein a plurality of the thin-film transistors are provided forming an integrated circuit including switching elements for driving pixels. Note figures 7-9 and paragraphs 0107-0109 and 0113-0121 of Reddy.

The difference between the prior art active matrix display, radio ID tag, or portable device disclosed by Reddy and the claimed device is that, where the claim requires a specific thin-film transistor, Reddy’s active matrix display, radio ID tag, or portable device includes a generic thin-film transistor.

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However, Duthaler et al. discloses an electronic display with a specific thin-film transistor having every limitation claimed in claims 16-18. Note figures 1-4 and paragraphs 0050-0068 and 0092-0096 of Duthaler et al. The question is, taking into account the high level of education, skill, and creativity of one of ordinary skill in the semiconductor art, would it have been obvious to achieve the invention of claims 16-18 by substituting the specific thin-film transistor taught by Duthaler et al. for Reddy's generic thin-film transistor.

To reject a claim on the basis of the rationale expressed in section IIIB of the *Examination Guidelines*, Office personnel first must resolve the Graham factual inquiries (as has just been done). Office personnel must then articulate the following:

- (1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by the substitution of some components (step, element, etc.) with other components;
- (2) a finding that the substituted components and their functions were known in the art;
- (3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and
- (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

As explained above, Reddy discloses a device (active matrix display, radio ID tag, or portable device) that differed from the claimed device only by the substitution of some components (a specific thin-film transistor) for other components (a generic thin-film transistor). Duthaler et al. discloses that the substituted components and their functions were known in the art. Further, Duthaler et al. discloses that those of skill in the art were familiar with a method of combining specific thin-film transistor with a electronic display,

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a device very similar to Reddy's active matrix display, radio ID tag, or portable device. From the similarities between the electronic display and Reddy's active matrix display, radio ID tag, or portable device, one of skill in the art would have been able to conclude that specific thin-film transistor could have substituted for the generic thin-film transistor of Reddy's active matrix display, radio ID tag, or portable device. One of skill in the art would have had reason to predict (based on its functioning in combination with electronic display) that specific thin-film transistor would have continued functioning much as it did in combination with Duthaler et al.'s electronic display, and that after the substitution, Reddy's active matrix display, radio ID tag, or portable device would continue functioning in the manner disclosed by Reddy. It would therefore have been obvious to a person having skill in the art to modify Reddy's active matrix display, radio ID tag, or portable device by substituting the specific thin-film transistor taught by Duthaler et al. for Reddy's generic thin-film transistor.

B. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over REDDY (2002/0094639) in view of NARAYAN (2002/0084504). In the examiner's opinion, this/these claim(s) would have been obvious according to rationale IIIB as expressed in the *Examination Guidelines*.

Considering the first and second factual findings (the first *Graham* factual finding, level of skill in the art, is the same as outlined above) required by *Graham*, the scope

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and content of the prior art includes, in the Reddy disclosure, a description of an active matrix display, radio ID tag, or portable device, wherein a plurality of the thin-film transistors are provided forming an integrated circuit including switching elements for driving pixels. Note figures 7-9 and paragraphs 0107-0109 and 0113-0121 of Reddy.

The difference between the prior art active matrix display, radio ID tag, or portable device disclosed by Reddy and the claimed device is that, where the claim requires a specific thin-film transistor, Reddy's active matrix display, radio ID tag, or portable device includes a generic thin-film transistor.

However, Narayan discloses a photodetector with a specific thin-film transistor having every limitation claimed in claims 16-18. Note figure 1B and paragraphs 0023-0032 of Narayan. The question is, taking into account the high level of education, skill, and creativity of one of ordinary skill in the semiconductor art, would it have been obvious to achieve the invention of claims 16-18 by substituting the specific thin-film transistor taught by Narayan for Reddy's generic thin-film transistor.

To reject a claim on the basis of the rationale expressed in section IIIB of the *Examination Guidelines*, Office personnel first must resolve the Graham factual inquiries (as has just been done). Office personnel must then articulate the following:

- (1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by the substitution of some components (step, element, etc.) with other components;
- (2) a finding that the substituted components and their functions were known in the art;
- (3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and

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(4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

As explained above, Reddy discloses a device (active matrix display, radio ID tag, or portable device) that differed from the claimed device only by the substitution of some components (a specific thin-film transistor) for other components (a generic thin-film transistor). Narayan discloses that the substituted components and their functions were known in the art. Further, Narayan discloses that those of skill in the art were familiar with a method of combining specific thin-film transistor with a photodetector, a device very similar to Reddy's active matrix display, radio ID tag, or portable device. From the similarities between the photodetector and Reddy's active matrix display, radio ID tag, or portable device, one of skill in the art would have been able to conclude that specific thin-film transistor could have substituted for the generic thin-film transistor of Reddy's active matrix display, radio ID tag, or portable device. One of skill in the art would have had reason to predict (based on its functioning in combination with photodetector) that specific thin-film transistor would have continued functioning much as it did in combination with Narayan's photodetector, and that after the substitution, Reddy's active matrix display, radio ID tag, or portable device would continue functioning in the manner disclosed by Reddy. It would therefore have been obvious to a person having skill in the art to modify Reddy's active matrix display, radio ID tag, or portable device by substituting the specific thin-film transistor taught by Narayan for Reddy's generic thin-film transistor.

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C. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over REDDY (2002/0094639) in view of KLAUK ET AL. (2003/0080426). In the examiner's opinion, this/these claim(s) would have been obvious according to one of the rationales expressed in the *Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.*, as published at 72 Federal Register 57526 et seq. (10/10/2007).

Considering the first and second factual findings (the first *Graham* factual finding, level of skill in the art, is the same as outlined above) required by *Graham*, the scope and content of the prior art includes, in the Reddy disclosure, a description of an active matrix display, radio ID tag, or portable device, wherein a plurality of the thin-film transistors are provided forming an integrated circuit including switching elements for driving pixels. Note figures 7-9 and paragraphs 0107-0109 and 0113-0121 of Reddy.

The difference between the prior art active matrix display, radio ID tag, or portable device disclosed by Reddy and the claimed device is that, where the claim requires a specific thin-film transistor, Reddy's active matrix display, radio ID tag, or portable device includes a generic thin-film transistor.

However, Klauk et al. discloses an electronic circuit with a specific thin-film transistor having every limitation claimed in claims 16-18. Note figure 3E and paragraphs 0066-0068 of Klauk et al. The question is, taking into account the high level of education, skill, and creativity of one of ordinary skill in the semiconductor art, would it have been obvi-

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ous to achieve the invention of claims 16-18 by substituting the specific thin-film transistor taught by Klauk et al. for Reddy's generic thin-film transistor.

To reject a claim on the basis of the rationale expressed in section IIIB of the *Examination Guidelines*, Office personnel first must resolve the Graham factual inquiries (as has just been done). Office personnel must then articulate the following:

- (1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by the substitution of some components (step, element, etc.) with other components;
- (2) a finding that the substituted components and their functions were known in the art;
- (3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and
- (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

As explained above, Reddy discloses a device (active matrix display, radio ID tag, or portable device) that differed from the claimed device only by the substitution of some components (a specific thin-film transistor) for other components (a generic thin-film transistor). Klauk et al. discloses that the substituted components and their functions were known in the art. Further, Klauk et al. discloses that those of skill in the art were familiar with a method of combining specific thin-film transistor with a electronic circuit, a device very similar to Reddy's active matrix display, radio ID tag, or portable device. From the similarities between the electronic circuit and Reddy's active matrix display, radio ID tag, or portable device, one of skill in the art would have been able to conclude that specific thin-film transistor could have substituted for the generic thin-film transistor of Reddy's active matrix display, radio ID tag, or portable device. One of skill in the art

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would have had reason to predict (based on its functioning in combination with electronic circuit) that specific thin-film transistor would have continued functioning much as it did in combination with Klauk et al.'s electronic circuit, and that after the substitution, Reddy's active matrix display, radio ID tag, or portable device would continue functioning in the manner disclosed by Reddy. It would therefore have been obvious to a person having skill in the art to modify Reddy's active matrix display, radio ID tag, or portable device by substituting the specific thin-film transistor taught by Klauk et al. for Reddy's generic thin-film transistor.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L. Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Sue A. Purvis, at 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to

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the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

***/Thomas L. Dickey/
Primary Examiner
Art Unit 2826***